UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/057,548	01/23/2002	Stephen T. Wellinghoff	SWRI-2835	2373

23770 7590 09/23/2004

PAULA D. MORRIS & ASSOCIATES, P.C.
d/b/a THE MORRIS LAW FIRM, P.C.
10260 WESTHEIMER, SUITE 360
HOUSTON, TX 77042-3110

EXAMINER	
SADULA, JENNIFER R	

ART UNIT	PAPER NUMBER
1756	

DATE MAILED: 09/23/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/057,548	WELLINGHOFF ET AL.	
	Examiner	Art Unit	
	Jennifer R. Sadula	1756	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 March 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-26,29-56 and 152-181* is/are pending in the application.

4a) Of the above claim(s) *29-56,152,155 and 156* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-26,153-154, 157-181* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *10/31/02, 2/27/04,*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☒ Other: *IDS: 3/26/04, 7/20/04*.

DETAILED ACTION

The following Office Action is a complete response to the amendment and arguments filed 3/10/04.

Response to Amendment

Applicant's amendments filed 3/10/04 have been entered and fully considered.

Response to Arguments

Applicant's arguments filed 3/10/04 have been fully considered but they are not persuasive. Applicants argue against the Examiner's assertion that the claimed combination does not require the particulars of the subcombination and the subcombination (by itself or in other combinations) has utility. Of issue here is the following restriction requirement between groups I and II:

I. Claims 1-26 and 153-154, drawn to a method for producing platform molecules having at least 3 rings, classified in class 526, subclass 72.

II. Claims 27-56 and 155-156, drawn to a method for producing polymerizable mesogens having at least 3 rings, classified in class 252, subclass 299.64.

In the previous rejection the Examiner noted, "In the instant case, the combination as claimed does not require the particulars of the subcombination as claimed because the combination (the platform molecules) have a utility in that they may be precursors to resin or non-resin materials. The subcombination has separate utility such as a liquid crystalline material for use in electro-optical displays." In the Applicant's arguments this assessment was

misrepresented as an assessment of a blanket clause wherein if the subcombination has a utility then the combination does not require the particulars. Instead the Examiner wishes to reiterate by stating that the combination and subcombination have separate utilities wherein the platform molecules may be precursors to resinous or non-resinous materials and wherein the subcombination may be liquid crystalline in nature. In addition to this point the Examiner notes that polymerizable mesogens and the methods for forming such are patentably distinct from methods of producing other basic molecules such as a "platform molecule". Regardless of the claim being cancelled and rewritten in a dependent form- it is still an invention capable of maintaining a separate patent as mesogenic compounds have distinct properties such as electro-optical properties, alignment properties, specific rigidity between the molecules, etc. The Examiner likens this to the following example: If an Applicant claims Ph-R-Ph wherein Ph represents phenyl rings and R is any carbon containing compound- this "product" produces a laundry list of compounds having different properties. However, it is well settled that each of the various "types" of compositions created by this generic formula are capable of supporting their own patents. The same holds true in this case: a method for mixing three rings each with functional groups provides for assorted products each capable of supporting their own patent- thereby deeming them "patentably distinct inventions" and thus the restriction is proper.

Subsequently the Applicants failed to argue against the election of species but instead stated that the Applicant "traverses the requirement...because the claims are directed to methods, not compositions... The election of species requirement is based on composition limitations—not method limitations". If the Applicant's assertion is that method claims may not include different species or embodiments, then the Examiner invites the Applicants to cite case law

where such is taught. However, the MPEP clearly states that an election of species requirement may be made among method claims (808.01). Furthermore, an election of species should not be required if the species claimed are considered unpatentable over each other. Such is not the case here.

As a result, the restriction and election of species are made final and claims 27-152 and 155-156 are withdrawn from further consideration. Examiner notes that claims 27-28, 57-152 have been cancelled. Examiner notes that the species depicted in claims 4, 8, 158-160, 165-168, 171, 180-181 has been elected with claims 1-3, 20 and 157 deemed generic.

Information Disclosure Statement

The IDS filed 10/31/2002, 2/27/2004, 3/26/04 and 7/20/04 have been considered in their entirety. However, Examiner notes that 3th reference of the IDS filed 2/27/04 is a duplication of a reference on an earlier filed IDS and thus is noted as considered on the later filed IDS.

Specification

The abstract of the disclosure is objected to because it fails to adequately describe the scope of the invention. The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details. The language should be clear and concise and should not repeat information given in the title. Correction is required. See MPEP § 608.01(b).

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-26, 153, 154 and 157-181 are rejected under 35 U.S.C. 102(e) as being anticipated by Seiberle et al., U.S. Patent No. 6,649,230 ("Seiberle").

Applicant claims a method for producing a blend comprising randomly substituted mesogens comprising the polymerizable platform molecules as specified. The blend comprises monomers wherein the ratio of monomers and the secondary monomer are "adapted to maintain" the blend in a nematic liquid crystalline state at room temperature. Examiner notes Applicant claims the method comprising a provision of compositional units to produce platform molecules. Claims have been examined with respect to the reactive groups not both being polymerizable in accordance with the Applicant's election of species.

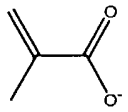
Seiberle teaches photoactive polymers which overcome high surface tension difficulties and coating problems (1:39-44). These photopolymers may be homopolymers or copolymers-preferably copolymers (18:30-32). Additives are taught by Seiberle to include inorganic materials (21:23-49) and liquid crystalline monomers for the purposes of alignment of these monomers (22:6-39 and see examples such as example 6). Although it is the Examiner's assertion that resins made of the same components in the same ratio would have the same

properties, it is clear from the reference that polymerization shrinkage is highly undesirable as the materials are spread evenly in a layered format and then polymerized- thus if shrinkage were to occur, deformation of the final product (and potential deformation of other layers) would occur.

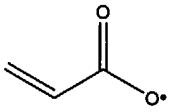
With regard to Applicant's claims, Examiner notes that the term "room temperature", utilized by Seiberle, defines approximately 21-23°C. Seiberle teaches that the materials in the examples are prepared at room temperature and then the reaction mixture is partitioned between dichloromethane and water; the organic phase washed repeatedly with water, dried over sodium sulfate, filtered and concentrated by rotary evaporation. This satisfies the Applicant's limitation that the addition temperature be 20°C.

With regard to Applicant's claims 1-3 and subsequently 20 and 26, Seiberle teaches photoactive polymers of the general formula I wherein the combination of S^5-M (the pendant moiety off of aromatic group B) consists of a "bulky organic group", providing steric hindrance. The rings E and D (when n^1 and n^2=0)may each be phenyl rings as shown in the examples (see column 22, example 1 and mon 1 in columns 35-36). The rings are substituted or unsubstituted by either H or may further be F, Cl, CN, or cyclic, straight-chain or branched alkyl residue that is further substituted or unsubstituted (6:9-24). With regard to claims 4, 153-154, 160, 170 and 171, the P-S^1 group of Seiberle anticipates Applicant's functional group consisting of a terminal functionality and a spacer group. The R^1 of Seiberle anticipates Applicant's additional functional group wherein the R^1 group may or may not be polymerizable (6:42-53). With regard to claim 55, the additional rings are taught by Seiberle. With regard to claim 157, Seiberle teaches forming the compounds- thus the monomeric units have been reacted.

With regard to Applicant's claim 56, Seiberle teaches that the preferred polymerizable groups are those of general formula II or III (column 7) are methacrylates or acryloyloxy groups as each group is (in respective order):



methacrylate



acryloyloxy

thereby satisfying the limitations of these claims having the polymerizable unsaturated carbon-carbon bond .

With regard to Applicant's claims 5-8 (and subsequently claims 11, 14, 17, 161, 164, 165, 168, 172, 175, 176 and 179-181), Seiberle teaches that the S^5-M bulky group may be essentially a polymerized t-butyl group (18:60-67). With regard to Applicant's claims 9-10 (and subsequently claims 12-13, 15-16, 162, 163, 166, 167, 173, 174, 177 and 178), Seiberle teaches that the S^1 spacer may be C_1-C_{24} wherein one or more CH_2 units are replaced with COO or O (6:26-39). Seiberle further, with regard to claims 18-19 (and subsequently claims 21-25, 158, 159 and 169), teaches the terminal functionalities of the R^1 group to include straight and branched chain alkyl residues where are substituted or unsubstituted as specified having C_1-C_{12} atoms (11:29-46), thereby anticipating hydroxyl groups as C_1, when substituted with an O group becomes a hydroxyl group and anything higher than C_1 (ie C_2-C_{12}) anticipates an alkoxy group or spacer group depending on if it is substituted or not.

Claims 1-4, 9, 10, 12, 13, 15, 16, 18-26, 153, 154, 157-160, 162, 163, 166, 167, 169-171, 173, 174, 177 and 178 are rejected under 35 U.S.C. 102(b) as being anticipated by Schadt et al., U.S. Patent No. 6,144,428 ("Schadt").

Schadt teaches an optical component comprising a hybrid layer formed from an orienting layer and a layer of cross-linked liquid crystalline monomer (abstract) wherein the liquid crystalline monomers are diacrylate components as shown in columns 3-6. Therefore, Schadt teaches, in accordance with Applicant's claimed invention (specifically claims 1-3, 20 and 26), a blended material wherein one or more platform molecules having the expressed terminal substituents as shown (representing Applicant's reactive groups) corresponds to Applicant's general structure. In each of Mon1, Mon2 and Mon3 of Schadt the substituents on the central ring are more substantial than the H-substitutions on the two outer rings- however this is most prevalent in Mon1.

Schadt further teaches inorganic additives, additional monomers and photoinitiators (example 1). Although it is the Examiner's position that like materials have like properties, it is additionally noted that the materials of Schadt must be capable of sustained nematic state as they are for use in determination of forgery.

With regard to Applicant's claims Examiner notes that the term "room temperature", utilized by Schadt, defines approximately 21-23°C. Schadt teaches that these components were used to develop a super-coolable nematic mixture having a particularly low melting point so that the LCP layer could be prepared at room temperature (5:10-15). This satisfies the Applicant's limitation that the addition temperature be 20°C.

With regard to Applicant's claim 56, Schadt teaches that the preferred polymerizable groups are as shown in the monomers of column 3-6 wherein the polymerizable groups are acryloyloxy groups (as defined and shown above), or more specifically acryloyloxy alkoxy groups, thereby satisfying the limitations of these claims.

With regard to Applicants claims 64-68 and subsequently claims 9-10 (and subsequently claims 12-13, 15-16, 162, 163, 166, 167, 173, 174, 177 and 178), Schadt teaches Applicant's A to be anticipated by Mon1 as being C_6, thereby falling within the ranges specified by these claims.

Claims 46- 68, 71 and 73-87 are rejected under 35 U.S.C. 102(b) as being anticipated by Jolliffe et al., U.S. Patent No. 6,117,920 ("Jolliffe").

Jolliffe teaches a thermochromic polymerizable mesogenic composition comprising components MA and MB (2:61-65) further comprising a photoinitiator and a dye component wherein the dye may be inorganic (claims). The mesogenic monomers and anisotropic polymers are for pigmentation or security applications and therefore these materials must exhibit low shrinkage and must be able to sustain a nematic state for months at a time (abstract).

With regard to Applicants claims, the polymerizable components MA are selected from formula I P-(Sp-X)$_n$-MG-R wherein R may be P-(Sp-X)$_n$- thereby granting the option that either one or both ends of the component be polymerizable. MG is defined in column 5 as A^1-Z^1-A^1-Z^1-A^2- which is preferably, as shown in the table in column 6, as a three-ring mesogenic group such as -Phe-Z^1-PheL-Z^1-Phe-; -PheL-Z^1-PheL-Z^1-PheL-; -Phe-Z^1-PheL-Z^1-PheL-; or -PheL-Z^1-PheL-Z^1-Phe-. With regard to Applicant's claims 9-10 (and subsequently claims 9, 10, 12, 13,

15, 16, 20-26, 158, 159, 162, 163, 166, 167, 169, 173, 174, 177 and 178), either option anticipates Applicant's three-ring mesogenic groups as L- the substituent group dangling off of either phenyl group (particularly central)- is halogen, cyano, nitro, C_1-C_7 alkyl, C_1-C_7 alkoxy or C_1-C_7 alkanoyl where one or more H atoms may be substituted by F or Cl (5:18-28). C_7 compounds indeed provide for anticipation of Applicant's steric hindrance.

With regard to Applicant's claims Examiner notes that the term "room temperature", utilized by Jolliffe, defines approximately 21-23°C. Jolliffe teaches that the materials be given short bursts of UV light at different temperatures in order to cure the materials. Some of the polymer cures at "room temperature", 25°C, 30°C and 35°C (26:31-46). This satisfies the Applicant's limitation that the addition temperature be 20°C.

With regard to Applicant's claim 56, Jolliffe teaches that the preferred polymerizable groups are vinyl, acrylate, methacrylate, propenyl ether or epoxies (4:65-67) thereby satisfying the limitations of these claims. Preferably, as noted in that passage, the groups are acrylates or methacrylates.

Jolliffe teaches that with respect to claims 4, 153-154, 160, 170 and 171, when the R group is not polymerizable it is an alkyl radical with up to C_{25} which may be substituted or unsubstituted and may be a sulfur containing, amino, sulfahydryl, halogen or the like (3:40-51).

With regard to Applicant's claims 5-8 (and subsequently claims 11, 14, 17, 161, 164, 165, 168, 172, 175, 176 and 179-181), Jolliffe teaches that the L group, herein interpreted as a bulky organic group, is an alkyl having up to seven carbon atoms and may be branched in nature- thereby anticipating t-butyl groupings (5:18-28). Lastly, Jolliffe teaches that the spacer group have C_1-C_{20} atoms (3:12).

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following references each teach Applicant's polymerizable mesogenic units as specified:

A. Verrall et al and Parri et al. each teach where the substituent on the central phenyl ring is C_1-C_7.

B. Coates et al '461 teaches where the substituent on the central phenyl ring is C_1-C_6.

C. Broer et al teaches where the substituent on the central phenyl ring is C_1-C_6 but is cured at what appears to be too high of a temperature.

D. Coates et al '092 and Coates et al. '955 each teach where the substituent on the central phenyl ring is C_1-C_4.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer R. Sadula whose telephone number is 571.272.1391. The examiner can normally be reached on Monday through Friday, 10am-6pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark F. Huff can be reached on 571.272.1385. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703.308.0661.

JRS
13 September 2004

SHEAN C. WU
PRIMARY EXAMINER